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Preface

Patterns of production and consumption in Asian economies are shifting significantly as a result of rapid growth, urbanization, and lifestyle changes. Among others, the levels of consumption of a wide range of resources, including materials, energy, and water, have reached unprecedented levels. This is also driving up greenhouse gas emissions. But Asia's efficiency in using its resources in production and consumption remains low by global standards, leading to high levels of waste per unit of product or service. Many Asian economies are failing to utilize the full value of resources—or *mottainai*, as the Japanese say.

Such inefficient patterns of resource use must be improved if environmentally sustainable economic growth is to be achieved in the region and the poverty reduction targets set in the Millennium Development Goals are to be met. There is also a direct relationship between higher resource efficiency and a lower carbon footprint. A principal route to sustainable development, therefore, is through reducing the life-cycle based natural capital inputs in the products and services that drive local, national, and global economies. This can only be done by improving resource efficiency—the amount of resources (materials, energy, and water) consumed in producing products or services.

This publication provides guidance to policy makers in the developing countries of Asia and the Pacific on the economic and environmental significance of resource efficiency and options for encouraging efficiency improvements. One of the key messages is that developing countries have the opportunity to leapfrog over conventional or outmoded technologies or production and consumption patterns by pursuing new options that simultaneously offer economic and resource efficiency gains along with environmental benefits.

The analysis presented is part of a wider effort initiated by the Asian Development Bank to facilitate economically efficient and environmentally beneficial investment in Asia and the Pacific and to support the Reduce, Reuse, and Recycle (3R) Initiative of the G8 nations as adopted at the 2004 G8 meeting and launched at a ministerial conference in Tokyo in 2005. Many international organizations and over 30 countries have agreed on the importance of the 3Rs in the context of sustainable development and have been supporting wider application of the 3R approach.

One focus of the 3R Initiative is on the international flow of materials. While other related efforts have centered on improving resource efficiency in production or in consumption, the 3R Initiative opened discussion on existing and future cross-border movement of secondary materials on a global scale.

The economies of Asia have already entered a period of rapidly increasing resource constraints and transition as they seek to maintain their economic growth without generating local environmental costs or unduly contributing to global environmental problems, such as climate change. National and local governments, the private sector, the academic community, nongovernment organizations and international organizations must all play a part in this transition. Measures are needed to ensure that rapid economic expansion can continue even as the proportions of energy and raw materials per unit of economic output decrease.

By providing a review of these issues and laying out a range of options for pursuing more resource-efficient economic growth, this report should assist decision makers in identifying strategies, policies and priorities for associated public and private sector investments to meet these objectives. While the paper centers on Asian and Pacific experience and options, the global consequences of resource use inefficiencies make this a topic of wide interest even outside of the region.



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Acknowledgements

We would like to express our special appreciation to those who have contributed their time and effort in producing this publication. The study was done by a team consisting of Asian Development Bank (ADB) staff, Taku Ohmura, Environment Specialist and study team leader; David McCauley, Senior Environmental Economist; and Masami Tsuji, Senior Environment Specialist.

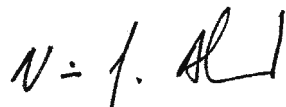
ADB received valuable inputs from those drawn from government agencies, the academic community, nongovernment organizations, private sector entities, and development agencies at subregional workshops on this topic held in South Asia (Kathmandu, August 2006) and Southeast Asia (Manila, February 2007). These workshops were jointly organized by ADB, the United Nations Centre for Regional Development, the United Nations Environment Programme, the Institute for Global Environmental Strategies (IGES), and other international or regional entities cooperating through the G8 3R Initiative.

This publication would not have been completed without the persistent and able efforts of Richard Stevenson and Jeffrey Bowyer, who served as consultants to ADB in preparing major sections of the report and coordinating the inputs of other contributors. Our gratitude also goes to the resource persons who provided specific contributions—Ernest Lowe of Indigo Development on industrial ecology, Michikazu Kojima of the Japan External Trade Organization on trade issues, Amit Jain of International Resources Group on electronic waste, and Prof. C. Visvanathan of the Asian Institute of Technology on solid waste management.

The report was prepared in close collaboration with IGES, represented by Yasuhiko Hotta, Policy Analyst, Waste and Resources Project. Other researchers from IGES who contributed to the report include Chika Aoki, Kentaro Ofuji, Saori Nakanishi, Oyuna Tsydenova, Shashi Kad, Maricor Muzones, Yatsuka Kataoka, Kyoko Matsumoto, and Tetsuo Kuyama.

We are also grateful to those who edited and proofread this report and an associated “highlights” version—Ma. Priscila del Rosario, Aldwin Thadeus Sutarez, Jay Maclean, and Wickie Baguisi. Administrative support was provided by Anicia Sayos, Ma. Editha Cruz, and Loreta Rufo.

Finally, we would like to express our appreciation to the many colleagues across ADB for their support and constructive feedback throughout the preparation of the report.



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Prologue: Report Structure and Key Messages

Both the public and governments across Asia and the Pacific are now giving very high attention to the environmental consequences of rapid economic growth and how to balance concern for environmental quality with the desire to continue the fast pace of development. Most of this report focuses on the vital role that governments, particularly national governments, can play in moving Asian economies toward greater resource efficiency as an important part of the answer to this question. While many of the specific strategies described in the report are not new, the unique contribution of the report is that it offers both a strong context for understanding the importance of attention to resource efficiency as a measure of how a country, sector or even a product is doing from the standpoint of balancing environment and economic factors as well as providing a range of policies, cases, and tools tailored to the Asian context.

Chapter 1 of the report explains the concept of resource efficiency and the reasons why this concept is essential to the new mix of clean, green, and economically efficient policies and programs for achieving environmentally sustainable economic growth. One of the central points is that any improvement in resource efficiency—whether in production or consumption—will almost always result as well in reduced greenhouse gas emissions. There is thus a direct link between resource efficiency improvements and efforts to mitigate climate change. But the report also shows that improving resource efficiency produces not only environmental gains but also can generate significant economic, financial, and social benefits.

Chapter 2 discusses the current inefficient use of materials, energy, and water in Asia and the Pacific, which is, nevertheless, associated with rapid economic growth. The inefficiencies are tied to the continued use of older manufacturing technologies and management practices coupled with patterns of consumption that seek to emulate those of Europe and North America. It also includes a discussion of the economic and environmental constraints associated with inefficient resource use.

Chapter 3 begins an analysis that stretches through Chapter 10 of the important roles that governments must play in efforts to improve resource efficiency. It stresses the need for integration and coordination across resource sectors and emphasizes the need for a transition to a future use of materials, energy, water, and land through strategic planning and in a more integrated manner. This integration is discussed across its spatial, temporal, and organizational dimensions.

Chapter 4 lies at the core of the report, examining the role that national governments can play in moving their economies toward greater resource efficiency and promoting the environmental enterprises needed to deliver it. It focuses on policy responses to the inefficient use of materials, energy, and water. While the management of wastes has traditionally addressed only material wastes, this report considers energy, water, and land as important resources, because their efficient use is vital to achieving a more sustainable pattern of development.

The last section of the chapter discusses four kinds of commonly applied policy instruments: regulatory, economic or market-based, informational, and voluntary.

Chapter 5 discusses compliance and enforcement issues, a weak link in the policy chain of many Asian countries' approaches to these problems. This chapter stresses the need for realistic institutional approaches to policy implementation, the absence of which will doom even the most progressive legislative reforms to failure.

Chapter 6 focuses on the critical role of local authorities in promoting improved resource efficiency. Local authorities are in a good position to influence the consumption habits that lead to high resource use. Community-based organizations and nongovernment organizations also play an essential role in local programs, especially in the areas of public awareness and education.

Chapter 7 discusses the importance of promoting investments in resource-efficient infrastructure for developing countries, given that infrastructure investments can establish a country's pattern of resource use for decades to come. This chapter highlights a key message of the report—that developing nations can leapfrog ahead to new technologies and economically and environmentally efficient solutions to the challenge of balancing rapid economic growth with environmental sustainability. Examples are provided in the areas of decentralized wastewater systems, resource recovery and recycling systems, and green buildings.

Chapter 8 looks at the role of governments in promoting greener enterprise development and new technologies, including research and development, technology transfer, and technology evaluation. It also looks at some major environmental technologies and services that investors may consider in searching for more resource efficient options.

Chapter 9 turns to actions that governments can take to improve support to industry, including public industrial facility managers in the region. These actions can help managers understand the real costs of waste and the benefits they can gain from adopting new practices and technologies.

Chapter 10 looks at regional aspects of resource efficiency, including the promotion of safe trade in secondary materials. As discussed in this chapter, transboundary trade in recyclable wastes can either complement waste minimization in the region or it can significantly increase environmental pollution and human health risk, depending on how it is conducted.

A final chapter highlights two fundamental propositions that emerge from the report. The first is that the economies of the region cannot continue long to support the very high demand for renewable and nonrenewable resources without significant negative consequences (e.g., excessive greenhouse gas emissions, higher international and domestic commodity prices, natural resource degradation, falling environmental quality) if current resource inefficient development patterns persist.

Second, governments around the region have the ability to follow an alternative development path that can not only help avoid such impacts but can also take advantage of enormous opportunities to invest wisely in infrastructure and institutions for their future. This can be done in ways that will simultaneously strengthen competitive advantage, generate jobs, and provide for a clean and productive environment.

Abbreviations

3Rs	–	reduce, reuse, recycle
3RKH	–	3R Knowledge Hub
ADB	–	Asian Development Bank
AFP	–	Agence France-Presse
AECEN	–	Asian Environmental Compliance and Enforcement Network
AIT	–	Asian Institute of Technology
ASEAN	–	Association of Southeast Asian Nations
BMRA	–	British Metals Recycling Association
CPCB	–	Central Pollution Control Board
CDM	–	Clean Development Mechanism
C&D	–	construction and demolition
DENR	–	Department of Environment and Natural Resources (Philippines)
CER	–	certified emissions reduction
DfE	–	design for environment
DIW	–	Department of Industrial Works (Thailand)
DSM	–	demand-side management
ECCJ	–	Energy Center Conservation of Japan
ECPF	–	Energy Conservation and Promotion Fund
EE	–	energy efficiency
EIP	–	eco-industrial park
EMS	–	environmental management system
EPR	–	extended producer responsibility
ESCO	–	energy service company
EU	–	European Union
e-waste	–	electronic waste
G8	–	Group of Eight
GDP	–	gross domestic product
GEF	–	Global Environment Facility
GHG	–	greenhouse gas
GNP	–	gross national product
GSC	–	greening the supply chain
GTZ	–	German Agency for Technical Cooperation
HS	–	harmonized commodity description and coding system
IE	–	industrial ecology
IEEFP	–	International Energy Efficiency Financing Protocol
IGES	–	Institute for Global Environmental Strategies
ISW	–	industrial solid waste
IWMI	–	International Water Management Institute
IWRM	–	integrated water resources management
JAMP	–	Japan Article Management Promotion Consortium
JBRC	–	Japan Battery Recycle Center
Lao PDR	–	Lao People's Democratic Republic
LFG	–	landfill gas
LGU	–	local government unit
LCA	–	life-cycle assessment

LEED	–	Leadership in Energy and Environmental Design
MDG	–	Millennium Development Goal
MEP	–	minimum energy performance standard
METI	–	Ministry of Economics, Trade and Industry (Japan)
MIEEP	–	Malaysian Industrial Energy Efficiency Improvement
MOEF	–	Ministry of Environment and Forests (India)
MSW	–	municipal solid waste
NGO	–	nongovernment organization
NRW	–	nonrevenue water
OECD	–	Organisation for Economic Co-operation and Development
PC	–	personal computer
PCB	–	Pollution Control Board
PCD	–	Pollution Control Department (Thailand)
PEP	–	Philippine Environmental Partnership Program
PRC	–	People’s Republic of China
PRO	–	producer responsibility organizations
PUB	–	Public Utilities Board (Singapore)
RDF	–	refuse-derived fuel
R&D	–	research and development
REACH	–	registration, evaluation, authorization, and restriction of chemical substances
RoHS	–	restrictions on hazardous substances
RSCO	–	resource service company
SMEs	–	small and medium-sized enterprises
TERI	–	The Energy and Resources Institute (India)
UN	–	United Nations
UNDP	–	United Nations Development Programme
UNEP	–	United Nations Environment Programme
UNESCAP	–	United Nations Economic and Social Commission for Asia and the Pacific
US	–	United States
WEEE	–	waste electrical and electronic equipment
WHO	–	World Health Organization
WSSD	–	World Summit on Sustainable Development
WTE	–	waste to energy